

DETAILED ACTION

1. This Office Action is in response to the Applicants' communication filed on 02/19/10. In virtue of this communication, claims 1-5, 8, 12-15, 18, and 19 are currently presented in the instant application.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 18 and 19 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 18 and 19 recite "computer-readable recording medium having stored therein a program". Applicant discloses no specific definition of a "computer-readable recording medium". The broadest reasonable interpretation of a claim drawn to a computer readable medium typically covers forms of non-transitory tangible media and transitory propagating signals *per se* in view of the ordinary and customary meaning of computer readable media. When the broadest reasonable interpretation of a claim covers a signal *per se*, the claim must be rejected under 35 U.S.C. § 101 as covering non-statutory subject matter. As applicant

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has not disclosed any specific definition of “computer-readable recording medium”, the broadest reasonable interpretation is not limited to non-transitory media.

In an effort to assist the patent community in overcoming a rejection or potential rejection under 35 U.S.C. § 101 in this situation, the USPTO suggests the following approach. A claim drawn to such a computer readable medium that covers both transitory and non-transitory embodiments may be amended to narrow the claim to cover only statutory embodiments to avoid a rejection under 35 U.S.C. § 101 by adding the limitation “non-transitory” to the claim.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1, 8, 13, 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites “an area discarder which discards a subarea obtained by the division by the area divider into a plurality of subareas and not including any valid pixels, which locates subareas that survived the discarding according to a predetermined rule”. The phrase “into a plurality of subareas” is objected to, as it does not refer back to what is being divided. Although it is known what is being divided (the unit areas, as described earlier in the claim), this phrase doesn't make sense in it's context, and renders the claim indefinite. For purposes of applying prior art, the claim will be read as

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"...discards a subarea obtained by the division by the area divider and not including any valid pixels". This has the same scope, but without the confusing sentence fragment.

Claims 13 and 18 contain the same language as claim 1 and are objected to for the same reason.

Claim 8 recites the limitation "the area discarder permits merging of subareas that belonged to unit areas before the division located at different coordinate positions in the screen coordinate system". Although this appears to be referring to the "expanded merge" embodiment (paragraphs 95-101), it is not entirely clear what the relationship is between the subareas and unit areas, rendering the claim indefinite. For purposes of applying prior art, the claim will be read as "permits merging of subareas that belonged to unit areas, which before the division were located at different coordinate positions in the screen coordinate system" to make clearer that the description is of the relationship of the unit areas rather than the subareas.

Claim 18 additionally recites "a dividing module which causes a computer to divide a unit figure into a plurality of unit areas on the screen coordinate system and outputting the unit areas; a module which causes a computer to discard a subarea obtained by the division into a plurality of subareas". Although the dividing module outputs a plurality of unit areas, the discarding module is referring to subareas. Claim 18 is indefinite, as it does not describe the relationship between the subareas and the unit areas. For purposes of applying prior art, the claim will be read as "a dividing module which causes a computer to divide a unit figure into a plurality of unit areas on the screen coordinate system and which divides each of the unit areas into a plurality of

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subareas and outputs the subareas;" This interpretation is taken to bring claim 18 in line with the other independent claims (as implied that it should be by applicant's remarks, in the 1/05/10 communication, pages 10-11).

Claim 19 is rejected for it's dependence on claim 18, inheriting the same indefiniteness.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-5, 8, 12-15, 18, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent Application Publication 2004/0212619 A1 (hereinafter **Saito**).

Regarding all claims, it is noted that applicant uses the terms "unit area" (claims) and "stamp" (specification) to refer to the concept of a first level unit of division, which Saito terms "chunk". Applicant's terms "subarea" (claims) and "quad" (specification) are likewise equivalent to the second level unit of division, which Saito terms "stamp".

Regarding claim 1, the limitation "a rasterizing unit which divides a unit figure into a plurality of unit areas on the screen coordinate system and outputs the unit areas" is taught by Saito (paragraphs 63-64, "The rasterizer 10 performs the processing of expanding a polygon on an image memory on a pixel-by-pixel basis. Pixel-by-pixel colors are determined by interpolating colors given to respective vertexes by a method

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called smooth shading. The rasterizer 10 outputs pixel-by-pixel data as a rasterization result to the chunk merge unit 100. The chunk merge unit 100 converts the pixel-by-pixel data into chunk-by-chunk data and performs a merger of data.")

The limitation "an area divider which divides each of the unit areas output from the rasterizing unit into a plurality of subareas" is taught by Saito (paragraph 77, "FIG. 10 is a block diagram showing another configuration example of the chunk merge unit 100 according to this embodiment in detail. In this example, a block shown in Fig. 10 is provided for every pixel. Accordingly, in this embodiment, the number of blocks shown in FIG. 10 must be the same as the number of pixels in a stamp. Since $2 \times 2 = 4$ pixels constitutes one stamp in this embodiment, four blocks shown in FIG. 10 are needed for one stamp." Although Saito does not explicitly outline the relationship between chunks, stamps, pixels, and the hardware components of the disclosed system, Fig. 10 shows that the chunk merge unit has an equal number of blocks (one block corresponds to one pixel) as there are pixels in a stamp, meaning that the chunk merge unit processes a single stamp at a time.)

The limitation "an area discarder which discards as necessary a subarea obtained by the division by the area divider and not including any valid pixels" is taught by Saito (paragraph 91, "The processing from step S130 to step S170 is performed by the chunk flush controller 132 of the chunk merge unit 100. Condition determination as to whether a conflict occurs or not is performed by the value comparison circuit 136 and the AND circuit 138." Paragraph 74, "Coverage and pixel parameters are data inputted from the rasterizer 10. The coverage is information indicating whether the pixel

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parameters are valid or invalid. That is, the coverage is information indicating whether it is inside or outside the triangle.” As shown in Figure 10, the coverage information is used to determine if a pixel is valid (an input to AND 138), which is used to determine if a stamp is valid. A stamp without any valid data will not be written, as shown in Figure 15, where some 2x2 stamps contain 1 or more invalid pixels (empty circles), but no stamps contain a full 4 invalid pixels.)

The limitation “which locates subareas that survived the discarding according to a predetermined rule so as to generate a merged area” is taught by Saito (paragraphs 98-100, “FIG. 16 is a flowchart for explaining stamp-by-stamp merging processing such as shown in FIG. 14 and FIG. 15. The merging processing shown in FIG. 16 is different from the merging processing shown in FIG. 13 in step S220. Namely, in the merging processing in FIG. 16, after step S120, it is determined whether a chunk in the same position exists and a conflict occurs to any one of all pixels in a stamp constituting the chunk (step S220). When no conflict occurs (step S220: No), the stamp is written as pixel data into the exiting chunk (step S170). On the other hand, if a conflict occurs to any one of pixels in the stamp (step S220: Yes), the chunk is flushed (step S150) and cleared (step S160).”)

The limitation “and which generates positional information indicating the relative position of each subarea included in the merged area within the unit area to which the subarea belonged before the division” is taught by Saito (paragraph 120, “FIG. 21 is a flowchart explaining the processing contents of the store/read mechanism shown in FIG. 20. As shown in FIG. 21, a stamp position is first acquired (step S300). A chunk

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position is then acquired (step S310).” Stamp positions are stored separate from chunk positions, and must inherently be relative, otherwise there would be a determination step required (deriving chunk from stamp position) or excessive redundancy (stamp position would contain chunk position, which is already stored elsewhere). Paragraph 116, “The chunk data d is $8 \times 8 = 64$ pixel information. Namely, the chunk data d is concrete pixel data on the entry.” In order to write the stamps to the correct position in the chunk data, d, the relative position of the stamp must be utilized (i.e. the stamp in the upper left will correspond to a different area of the chunk data, d, than the stamp in the lower right).)

The limitation “an area writer which writes the subareas included in the merged area into a memory and which relocates each subarea in its original position by writing the subarea in an address corresponding to the positional information” is taught by Saito (paragraph 64, “The chunk merge unit 100 converts the pixel-by-pixel data into chunk-by-chunk data and performs a merger of data. Data resulted from the merger is outputted to the chunk data buffer 110.” It is noted that although Saito does not explicitly “[relocate] each subarea in its original position”, this is inherently met by Saito’s teaching. Saito’s “predetermined rule” for generating a merged area is effectively “do not relocate any subarea”, and therefore Saito does meet the claim limitations without including an explicit step corresponding to the “relocates each subarea”.

Regarding claim 2, the limitation “the area discarder generates the merged area by sequentially locating subareas that survived the discarding and that do not include

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any valid pixels at the same coordinate positions in the screen coordinate system and when a subarea that includes valid pixels at the same coordinate positions in the screen coordinate system as any of the subareas hitherto located is input, the area discarder outputs the merged area including the subareas hitherto located and starts generating the next merged area" is taught by Saito (paragraphs 98-100, "FIG. 16 is a flowchart for explaining stamp-by-stamp merging processing such as shown in FIG. 14 and FIG. 15. The merging processing shown in FIG. 16 is different from the merging processing shown in FIG. 13 in step S220. Namely, in the merging processing in FIG. 16, after step S120, it is determined whether a chunk in the same position exists and a conflict occurs to any one of all pixels in a stamp constituting the chunk (step S220). When no conflict occurs (step S220: No), the stamp is written as pixel data into the exiting chunk (step S170). On the other hand, if a conflict occurs to any one of pixels in the stamp (step S220: Yes), the chunk is flushed (step S150) and cleared (step S160). Namely, all of four pixels in a stamp which are processed at the same time are written into the existing chunk data buffer 110 or written into a newly generated chunk.")

Regarding claim 3, the limitation "wherein each of the merged areas has the same size as the unit area" is taught by Saito (Figures 3, 11, 12, 14, 15, 17, 18 all show pre-merge and post-merge chunks being the same size.)

Regarding claim 4, the limitation "wherein the size of the subarea corresponds to a unit throughput in which the area writer writes the subareas into the memory" is taught by Saito (paragraph 77, as quoted above. The number of blocks in the chunk merge

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unit is equivalent to the number of pixels in a stamp, meaning each unit of throughput from the chunk merge unit will correspond to the stamp size.)

Regarding claim 5, the limitation "wherein, of the subareas that survived the discarding process by the area discarder, the area discarder merges subareas derived from unit areas having the same coordinates in the screen coordinate system before the division" is taught by Saito (paragraph 146, "As described above, in the example in FIG. 24, when plural existing stamps exist in the same position, a stamp in which no conflict occurs is found from the existing stamps.")

Regarding claim 7, the limitation "wherein the unit area is a rectangular area, the rasterizing unit divides a rendering area so that each of the plurality of unit areas includes a pixel group, the pixel number in the vertical direction and the pixel number in the horizontal direction of a pixel group in a given unit area being identical with the corresponding numbers of a pixel group in another unit area" is taught by Saito (paragraph 61, "In the example in FIG. 3, one chunk is composed of $8 \times 8 = 64$ pixels. This chunk is a fragment in this embodiment. By using the concept of the chunk, it is guaranteed that pixels which are continuously thrown in are not in the same position, and the chunk is processed by a pixel processor." While not explicitly stated by Saito, it is inherent that all chunks must be of equivalent size, because there is no consideration given to determining the size of any given chunk in the disclosure. If chunks were to vary in size, the invention would become inoperable. While Saito also fails to explicitly state that chunks are rectangular, all provided examples (in both figures and text) are rectangular, making this an implicit feature of Saito's disclosure.)

The limitation “the area divider divides the unit area including the pixel group into a plurality of subareas each including a small pixel group, the pixel number in the vertical direction and the pixel number in the horizontal direction of a pixel group in a given subarea being identical with the corresponding numbers of a pixel group in another subarea” is taught by Saito (paragraph 77, “Accordingly, in this embodiment, the number of blocks shown in FIG. 10 must be the same as the number of pixels in a stamp. Since $2 \times 2 = 4$ pixels constitutes one stamp in this embodiment, four blocks shown in FIG. 10 are needed for one stamp.” Similar to the logic presented in the previous paragraph, while not explicitly stated that stamps must be of equivalent size, it is inherent to the invention, because there is no consideration given to determining the size of any given stamp. If stamps were to vary in size, the invention would become inoperable.”)

Regarding claim 12, the limitation “wherein the area writer comprises a memory access unit which writes pixels included in the subarea into memory in parallel” is taught by Saito (paragraph 66, “The image rendering device shown in FIG. 4 has the most basic configuration, and one chunk data buffer 110 and one pixel processor 20 are provided for one chunk merge unit 100. It is possible to simultaneously store one or more pieces of chunk data in the chunk data buffer 110.”)

Regarding claims 13 and 18, the limitations are similar to those treated in the above rejection(s) and are met by the references as discussed in claim 1 above.

Regarding claims 14 and 19, the limitations are similar to those treated in the above rejection(s) and are met by the references as discussed in claim 2 above.

Regarding claims 15, the limitations are similar to those treated in the above rejection(s) and are met by the references as discussed in claim 7 above.

Allowable Subject Matter

8. Claim 8 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The combination of elements taken as a whole, are not disclosed or rendered obvious by the cited prior art. The limitations of claim 8, taken in their entirety (and omitted for brevity) are allowable over the cited prior art, because the cited prior art does not teach the concept of merging 'subareas' (using applicant's claim terminology) which were derived from 'unit areas' not located in the same screen space. The cited prior art only contemplates the merging of 'subareas' derived from 'unit areas' located in the same screen space.

Response to Arguments

9. Applicant's arguments, see page 10, filed 01/05/10, with respect to 112 2nd rejection of claim 4 have been fully considered and are persuasive. The 112 2nd rejection of claim 4 has been withdrawn.

10. Applicant's arguments filed 01/05/10 have been fully considered but they are not persuasive.

Applicant argues that claims 18 and 19 have been amended to be directed toward statutory subject matter. However, as noted in the rejection above, as the specification does not define “computer-readable recording medium”, the broadest reasonable interpretation includes transitory media and is non-statutory for that reason. Thus this is not persuasive.

Applicant argues that the independent claims have been amended to recite two particular features in order to distinguish from Saito, as well as how these features distinguish. Although these features have been searched, and do not appear to be taught in the prior art, the language of the claims does not adequately distinguish over Saito.

Regarding feature 1, applicant notes a “predetermined sequence **without creating any gap**”, but there is no limitation in the independent claims that corresponds to this. There is mention of a predetermined sequence, but Saito reads on this, as Saito's sequence is predetermined as well.

Regarding feature 2, it is noted that Saito provides this same feature by simply not relocating subareas. The relative pre-division location is the same as the relative merged location, which is the same as the relative written location. In other words, a subarea which was located in the upper left of a unit area divided into four subareas will have the same location in the merged area and the written area. Applicant also suggests that because the relative positions are unchanged in Saito, no positional information is generated. However, as noted, Saito's method inherently requires knowledge of the relative position, and so it must be generated at some point.

Applicant argues that the present claimed invention allows three or more areas to be merged and Saito at best teaches merging two. However this does not appear to be in any of the claim language.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT BADER whose telephone number is (571)270-3335. The examiner can normally be reached on M-T 9am-5pm EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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